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A NOTE ON RECENT POLICIES FOR HIGHER EDUCATION IN CHILE

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Executive Su-ary

Educational expansion at the primary and secondary levels tends to have an equalizing effect on the distribution of earnings for a given wage structure. However, the resulting change in relative supplies of labor generates an offsetting increase in the wages of more educated workers relative to less educated workers. If changes in the demand for labor are also skill-biased, the unequalizing wage effects will be larger. Moreover, in countries with higher initial levels of education, private and public rates of return to higher education are often higher than the rates of return to primary and secondary education. This confluence of facts appears to be the case for Chile. Section I discusses the relationship between educational expansion, government schooling policy, relative wages and relative supply, allowing me to develop a model to analyze the facts for Chile. I show that the redistribution of government spending away from higher education unambiguously contributed to the greater dispersion of relative wages and, when accompanied with skill-biased demand, will easily lead to higher earnings inequality. I also show that, given skill-biased demand, the portion of public spending on education must rise to maintain constant relative wages. Section II focuses on the potential role of skill-biased demand, highlighted in Section I, concluding that skill-biased demand may continue in Chile. Thus, relative government expenditures on education, which fell in the 1980's, will need to increase to maintain constant relative wages; still further increases would be required to lower relative wages and equalize the earnings distribution. Section III examines the equity of access to higher e&cation, finding that it seriously deteriorated because of higher fees at traditional universities and the growing dominance of private universities that charge high fees and give no loans or scholarships. Section IV asks whether Chile could afford to pay more on higher education and education in general. I find that because public educational spending per GDP fell sharply since 1980 and public spending on higher education fell even more sharply, that Chile both can, and probably should, increase public expenditures on education as a whole and relatively more on higher education. The recommended form for increasing higher education - that would raise enrollments and equity of access while preserving decentralization, and competition in the provision of educational services - is through means-tested loans and grants. While this issue has begun to receive some attention from the current government, current efforts may not be enough.

These results have important implications for other countries. First, redistribution of relative

government spending is not always warranted in LDCs and, when warranted, can be exaggerated. Second, this concern can be more important for countries liberalizing trade, as such liberalization can widen wage differentials. Third, the equity of access to higher education is likely to rapidly worsen from the redistribution of government spending on education towards basic education and the ongoing privitization of higher education. The welfare costs of these negative effects are important, but the static and dynamic efficiency losses may also be substantial.

A Note on Recent Policies for Higher Education in Chile

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Introduction

There is no doubt that since 1974, "post-reform" Chile has made progress in terms of towards socioeconomic goals. It has reduced unemployment, lowered poverty and increased real wages - developments which have accelerated since 1985. Since 1975, Chile has continued to upgrade the education of its labor force. This success sometimes translates into unconditional accolades for Chile's policy reforms as well as a reluctance to examine their potential side-effects or unnecessary extremes. Such reluctance contributed to the first round of privatization and liberalization failures in the early 1970's. The subsequent, more moderate approach was critical to successful export promotion, reprivatization and restoration of the health of the banking system. Thus, Chile also serves as an example of how good ideas carried to an extreme can have pernicious - even disastrous - effects (e.g. deregulation and the subsequent collapse of the banking system in the early 80's). Hence, it is important that enthusiasm for Chile's accomplishments does not lead us to deprive ourselves of the lessons that a critical examination of the nation's policy reforms can yield. It is in this spirit that this note examines potential trade-offs associated with the redistribution of educational spending.

The current government's stated goals emphasize enhancing efficiency and equality. This note discusses some of the equity and efficiency implications of the significant redistribution of educational spending in the 1980's from higher education to basic education. I explore whether there is a relationship between this redistribution and the rising relative wage inequality documented in Robbins (1994A) and analyzed further in Robbins (1994B) . To the extent that such a redistribution alters relative private costs of education in favor of

basic education, one would expect that the marginal impact of such a redistribution is to make less educated workers relatively more plentiful and workers with higher education more scarce, holding other things constant. It is reasonable, therefore, to enquire whether the redistribution of educational expenditures involved a trade-off between higher enrollments in basic education and a higher wage gap between the more and less educated; however, that in no way attributes all responsibility for a rising wage gap to changes in educational policy, nor does it deny the other benefits of such policies. A second potential trade-off from redistributing educational expenditures concerns the equity of access to higher education. It is widely understood that credit markets for investment in education are highly imperfect. A redistribution of spending away from higher education can increase the inequality of access to higher educational. This note seeks to shed light upon these questions by exploring the logical structure of these issues and the available empirical evidence. While arriving at some important conclusions, I make no pretense of providing a comprehensive review of Chilean educational policy or definitively resolving these issues.

I focus on two questions: first, whether the level of spending on university education has been and continues to be, high enough to achieve. these equity and efficiency goals; second, what trade-offs did the redistribution away from higher education in the 1980's entail? This question emerges from recent research [Robbins(1994A); Robbins(1994B); Marcel and Solimano (1993)] which shows that the structure of relative wages of more versus less educated workers grew significantly over the period 1975 through, at least, 1990. My second question is whether the equity of access to university education has been, and will continue to be, adequate. This question bears upon efficiency as well as equity, because by

effectively restricting the access of bright students of poor families to universities, such unequal access can lower the average quality of university students. This issue of equity of access to university education arises for three reasons: first, there were large post-reform shifts in education spending - from university education towards primary and secondary education - that increased the private costs of university education: second, since 1980, there has been the rapid growth of private universities which extend no credits or loans to students; and third, because the wage premium from going to a university rose significantly after 1975, the monetary consequences of unequal access to university education increased.

In raising these questions, I do not disagree with the position that, for many less developed countries (LDCs), too much money is spent on university education relative to primary and secondary education. Instead, I seek to ask whether there are important qualifications to that position that deserve highlighting. Jiminiez(1986) argues convincingly that for many LDCs, spending on higher education constitutes a net transfer to the wealthy. Under this argument, because children of the affluent go to private schools where they attain better educations, they prevail over children of poorer families for positions at universities. This inequality is compounded by the relatively higher opportunity costs of higher education faced by the poor children. Yet, it is clearly possible to overemphasize basic education. For which countries is this the case? Perhaps this position is less pertinent to countries beginning with high enrollment rates in basic education. Moreover, the Jiminez argument does not address the indirect influence of relative supply shifts on relative wages. Nor does it address the possibility that demand can sometimes be skill-biased, or that trade liberalization, for example, in some countries could spur the modernization of capital and techniques that imply

skill-biased growth of demand. Do those considerations imply that shifts in educational expenditures should be conditioned on the level of educational attainment in these countries? For countries, like Chile, which began with relatively high initial stocks of primary and secondary education, perhaps initial redistributions of educational expenditures towards primary and secondary education from higher education need to be shifted back to higher education as basic education goals are achieved.

Social Rates of Return to Schooling and Initial Endowments of Schooling

The possibility that redistributing educational expenditures towards basic education may be less appropriate for countries that begin with relatively high initial stocks of primary and secondary education is supported by data on the private and social rate of return to different levels of schooling for Latin American countries and, in particular, for Chile. Shifting government spending to basic education from university education is usually justified on the basis that the social rates of return to schooling are higher for basic education. In the table below, which reports social and private rates of return to schooling for several Latin American countries, we can see that this is frequently true. The countries in Group A, below, tend to have higher social and private rates of return for primary education than for secondary or university education. These countries are relatively poorly endowed in basic education vis a vis university education.

It is common for such countries to have heavily subsidized university education while children of the well-to-do go to private primary and secondary schools and then disproportionately receive the fruits of subsidized education. Moreover, such subsidies to

university education often produce an oversupply of university graduates - a situation reflected in the lower relative returns to university versus primary education.

However, this pattern is not universal. On the contrary, in Group B I see that for Argentina and Chile in 1989, the social and private rates of return to primary education were equal to or lower than the social rate of return to university education.

Table 1. Private and Social Rates of Return to Education by Level of Education (percent)
(private rates of return are in parentheses)

Country	Year	Primary	Secondary	University
GROUP A				
Brazil	1989	35.55 (36.61)	5.08 (5.13)	21.44 (28.17)
Dominican Republic	1989	n.a. (85.11)	n.a. (15.11)	n.a. (19.43)
El Salvador	1990	16.39 (18.90)	13.33 (14.51)	8.00 (9.50)
Guatemala	1989	n.a. (33.75)	n.a. (17.85)	n.a. (22.22)
Paraguay	1990	20.30 (23.74)	12.74 (14.64)	10.84 (13.73)
GROUP B				
Argentina	1989	8.44 (10.14)	7.06 (14.16)	7.55 (14.92)
Chile	1989	8.05 (9.70)	11.10 (12.91)	14.00 (20.69)
GROUP C				
Average for Region	1988-1989	17.9 (26.2)	12.8 (16.8)	12.3 (19.7)

Source: Psacharopolos and Ng(1992), p.30; Psacharopolos(l993) p.7.

This is due to the relatively high primary and secondary enrollments and lower subsidies to

university education. Note as well that while for the region as a whole, the rates of return to schooling are higher for primary and university education. However, the same is not true for Chile or (to a lesser degree) Argentina.

These results bring into question whether Chile's relative supply of university graduates has been sufficiently high and versus the possibility that, for Chile, and similar countries, large redistributions of public education expenditures away from university education can be ill-advised. In the long run high private rates of return should induce a supply response that would equalize these rates of return. However, imperfect capital markets may slow this response and exacerbate the unequal access to university education (further constraining the upward educational mobility of those from poorer families and lowering the average ability of university students).

To provide a conceptual foundation for my analysis of the impact of educational policy upon earnings inequality, I discuss how educational expansion and government education policy affect relative wages and income inequality.

The rest of this note is organized as follows. Section I discusses the relationship between educational expansion, government schooling policy, relative wages and relative supply. I develop a model that allows me to analyze the facts for Chile, serving as a conceptual basis for the rest of the note. *Inter alia* I show that the redistribution of government spending away from higher education unambiguously contributed to greater wage dispersion and - when accompanied with skill-biased demand - higher earnings inequality. Also, given skill-biased demand, the portion of public spending on education must rise simply to maintain constant relative wages. I then discuss possible future trends in skill-biased

demand, concluding that continued upward pressure on the wages of university graduates is possible. Therefore, government expenditures on education, which fell in the 1980's, would need to increase to maintain constant relative wages. Section III examines the equity of access to higher education. I find that it has deteriorated seriously because of higher fees at traditional universities and the growing dominance of private universities that charge high fees and provide loans and scholarships. Section IV asks whether Chile can afford to spend more on higher education and education in general. I find that because public educational spending per GDP fell sharply since 1980 and public spending on higher education fell even more sharply, Chile can (and probably should) increase public expenditures on education as a whole. It should place a special emphasis on higher education. The recommended approach for increasing enrollments and equity of access to higher education - while preserving decentralization and supporting competition in the provision of education services - is through means tested loans and grants. This issue has begun to receive some attention from the current government, but this attention must be expanded and more focused.

SECTION I. EDUCATIONAL EXPANSION AND PUBLIC EXPENDITURES - THEIR IMPACT ON SUPPLY, WAGES AND INEQUALITY: CONCEPTUAL FOUNDATION AND IMPLICATIONS FOR CHILE

In this section I review the relationship between educational expansion and the distribution of earnings. Hcrc I emphasize that whilc expanding basic education can have a "composition" effect that reduces earnings inequality for a given wage structure, it also generates a countervailing "wage effect" which skill-biased demand will exacerbate. I then present a simple model of how government educational policy affects wage and supply determination, providing me with the tools to examine the impact of Chilean educational policy, past and present. That model also highlights the central role of the structure of the demand for labor, to which I will turn in the subsequent section.

EDUCATIONAL EXPANSION AND THE DISTRIBUTION OF EARNINGS

Neutral Demand

The impact of changing the mix of educational expenditures upon the distribution of earnings reflects two key effect: changes in the distribution of education, or "composition effects", and changes in the structure of wages, or "wage effects" (see, e.g., Park, Ross and Sabot (1994)). Composition effects measure the effects of changes in the distribution of education for a given wage structure across workers with different levels of education. Educational expansion at levels below the mean level of the initial distribution of education tend to decrease the variance of schooling among workers, thereby increasing the inequality

of earnings for a given wage structure. Educational expansion at level s of education above the mean tend to increase the variance of schooling across workers and increase the inequality of wages for a given wage structure [Almeida and Barros(1992)]. Hence, countries with low levels of primary and secondary enrollments may be able to significantly decrease the variance of schooling and reduce inequality by increasing primary and secondary educational attainment. However, the equity gains from such expansion tend to diminish as primary and secondary enrollment levels rise because their impact on the variance of schooling decreases.

While composition effects can dominate wage effects in their overall impact on distribution, this is not automatic [e.g. Knight and Sabot(1983)]. Educational expansions that have large equalizing composition effects tend to generate offsetting wage effects that increase earnings inequality. Such wage effects can negate or overwhelm the composition effects. For a given structure of relative demand for labor across schooling groups, a rise in the relative supply of less educated workers alters their relative scarcity and lowers their wages relative to more educated workers. Thus, rapid educational expansion at primary and secondary levels of schooling can lead to an increase in the wages of university educated workers compared to workers with primary or secondary educations. For these reasons, an educational expansion, whose composition effects are positive, can have an overall negative impact on the distribution of earnings.

Non-Neutral Demand

I have seen that, even for a constant structure of demand, the effect of expanding basic education upon the earnings distribution is a double-edged sword. While lowering the

variance of schooling, it raises the relative wage gap across schooling groups. If, in addition, the structure of demand for education is biased in favor of more educated workers, this will magnify the potentially unequalizing wage effect of educational expansion concentrated at the primary and secondary levels.

While it is common to assume that technology is endogenous, and chosen or adapted to match domestic factor prices, there is growing evidence that technology and derived labor demand is increasingly exogenous and skill-biased. For the U.S. a large, growing literature has emerged arguing that demand since the late '70's have been skill-biased [e.g. Berman, Bound, Grichiles(1992), Katz-Murphy(1992), Levy and Murnane(1992), A. Krueger(199 1)] . For Chile, Robbins(1994A) and Robbins(1994B) find evidence of a similar pattern of skill-biased demand in Chile, especially after 1975.

Robbins(1994A, 1994B) find that relative wages increased in favor more educated workers in the aftermath of trade liberalization - contrary to what is traditionally assumed. Demand changes in the post-1974 period must have moved to favor more educated workers, since the widening relative wage structure was not due to relative supply changes or domestic reforms. These demand changes were not found to be principally caused by shifts of employment across industries or between industry shifts. Since the distribution of employment across industries in 1992 was quite similar to that of the 1960 and the changes in this distribution of employment across industries in the-post-1974 period were similar to those in the 1960s, it appears as though "within" industry changes in the structure od demand for schooling are the principal cause of the observed reactive wage changes. The importance of within industry demand changes was supported by findings of rapid educational and

occupational upgrading. Furthermore, a disaggregation of employment changes into between and within-industry shifts found strong within-industry shifts favoring more skilled workers in the post- 1975 period.

This clear pattern of skill-biased growth runs counter to traditional trade predictions and may be, in large measure, the result of the indirect effects of trade liberalization. The 'New' Trade theories argue that trade can raise the international transfer of and premium on knowledge and new techniques, thereby raising the gross returns to schooling. [1]

For post-reform Chile, I confront a situation where skill-biased demand changes out-paced supply and led to rising relative wages for more educated workers. As in the U.S. over the similar period, the supply of university educated workers did increase, but not rapidly enough to keep the relative wages of university educated workers from rising.

I now examine how government educational policy affects wage and supply determination, providing me with the tools I will use to examine the impact of Chilean educational policy, past and present. This framework highlights the central role of the structure of the demand for labor, to which I will turn in the next section.

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[1] Robbins(1994) argues that the association of relative wages with trade liberalization may be causal, though indirect. Trade liberalization may relax foreign capital constraints and increase domestic and international competitive pressures, leading to the rapid economy wide modernization nf techniques. If these techniques are. as recent evidence for the U.S. suggest. skill biased then there could be both a sudden jump in skill intensiveness of production onto a continuing path of skill biased technological change.

ANALYZING THE INTERACTIONS AMONG GOVERNMENT POLICY, LABOR DEMAND AND SUPPLY, AND WAGES.

How does the pattern of government expenditures on education affect relative wages and the distribution of earnings? In this section I develop a conceptual framework with which to analyze these questions. Because relative wages both affect and arc affcctcd by thc structure of government expenditures affects both, one must analyze this interaction as a system of equations.

Consider two groups of workers: group one has high education and group two has low education. Subscripts 1 and 2 refer to these groups. One would like to focus on the impact of changes upon the distribution of education(al?) spending on relative wages: W_1/W_2. I adopt the notation "x" for $\ln (X_1/X_2)$, the "log of relative x", or sometimes just "relative x" . Clearly relative wages reflect both relative supply and relative demand. I adopt the notation 'd' or 'D_1/D_2' for relative demand and 'S' or 'S_1/S_2' for relative supply.

(1) $w = f(d,s)$

In the medium and long-run supply is endogenous. Relative supplies are effected by relative wages and government subsidies. Let g denote relative government spending or (G_1/G_2) where G_i is government expenditure on the ith group. Relative supply rises in response to both rises in relative government spending (g) and relative wages (w) as expressed in equation (1) below.

(2) $s = h(g,w),$

where $h_1 > 0$ because an increase in relative public expenditures on average decreases the relative private costs or increases the relative quality of education. It is convenient to transform (1) and (2) into percentage changes and elasticities where "$\hat{x}$" is the rate change of x. This give me:

(1a) $\hat{w} = \alpha\hat{d} + \beta\hat{s}$; $\alpha > 0, \beta < 0,$

(2a) $\hat{s} = \gamma\hat{g} + \theta\hat{w}$; $y > 0, \theta > 0,$

where α, β, γ and θ are elasticities of the dependent variables with respect to the corresponding right-hand variables. Because $\hat{w}$ is endogenous in this system of equations, I solve for the reduced form of $\hat{w}$, or $\hat{w}^*$:

(3) $$\hat{w}^* = \frac{1}{[1 - \beta\theta]} \cdot [\alpha\hat{d} + \beta\gamma\hat{g}1$$

and for $\hat{s}^*$

(3a) $$\hat{s}^* = \frac{1}{(1 - \beta\theta)} \cdot [\theta\alpha\hat{d} + \gamma\hat{g}\ ].$$

(2) $s = h(g,w)$,

To examine the effect of changes in relative government spending I can take the derivative of $\hat{w}^*$ with respect to $\hat{g}$:

$$(4) \qquad \frac{\partial \hat{w}}{\partial \hat{g}} = \frac{1}{[1 - \beta\theta]} \cdot (\beta\gamma) < 0.$$

$$+ \quad - \quad -$$
$$+$$

This derivative is unambiguously negative. The marginal effect of a decrease in relative spending on university education unambiguously increases relative wages (i.e. widens the wage gap). Similarly, increases in relative public expenditures on higher education raise the equilibrium relative supply of higher education. The derivative of s with respect to government expenditures is positive:

$$(4a) \qquad \frac{\partial \hat{s}^*}{\partial \hat{g}} = \frac{1}{[1 - \beta\theta]} \cdot (\gamma) > 0.$$

$$+ \quad - \quad +$$
$$+$$

If relative demand changes are positive then relative government expenditures on education would need to rise to maintain constant relative wages, to say nothing of bringing them down from high levels. Setting $\hat{w}$ to zero reflecting constant relative wages, if relative demand is rising then $\hat{d}$ is positive and I can solve for the growth rate of relative government expenditures consistent with unchanged relative wages, $\hat{g}^*$:

$$(5) \qquad \hat{g}^{*} = \frac{-(\alpha)}{(\beta\gamma)} a \quad .$$

Because $[-\alpha/(\beta\gamma)]$ is positive, an increase in relative demand - i.e. skill-biased demand growth ($\hat{d} > 0$) - , requires an increase in relative goyemment expenditures simply to keep relative wages constant. Alternatively, if relative demand growth were neutral, then relative government expenditure would also have to grow to reduce relative wages from high levels.

The preceding discussion makes clear that the marginal effect of a decrease in relative government spending on education is to widen the wage gap. But, I have argued that, for Chile, the wage gap rose and the relative supply of education either rose or remained constant [Robbins (1994A)]. Since the marginal effect of a decrease in relative government spending would lower relative supply, then can one not conclude that relative government spending was adcquatc and did not contributc to falling rclativc wagcs in Chilc? What should onc expect when expenditures on education decline and demand is skill-biased (or $\hat{g} < 0$ and $\hat{d} > 0$) as was the case in Chile during the period of study?'

It has just been shown that the marginal effect of a decline in $\hat{g}$ is to increase equilibrium relative wages. From (la) it is clear that an increase in relative demand will also raise relative wages so that the marginal and total effects of ($\hat{g} < 0$ and $\hat{d} > 0$) are clearly to widen the wage gap. However, their effects on equilibrium supply growth are less clear. Consider the total differential of the equilibrium level of $\hat{s}$, where as in Chile $\hat{g} < 0$ and $\hat{d} > 0$ (here $d\hat{d}$ is the differential of d):

$$(6)\qquad d\hat{s}^{*} = \underbrace{\frac{\partial s^{*}}{\partial \hat{g}}\, d\hat{g}}_{A} + \underbrace{\frac{\partial s^{*}}{\partial \hat{d}}\, d\hat{d}}_{B} \;\gtrless\; 0, \quad \text{as} \quad A \;\gtrless\; B \;.$$

For $\hat{g} < 0$ the first term, A, is negative, while for $\hat{d} > 0$ the second term, B, is positive. The resulting change in equilibrium relative supply growth depends on the relative strengths of these effects. The fact that relative supply growth was constant or increasing in the face of falling relative spending on higher education further emphasizes the importance of the skill-biased growth I documented earlier [Robbins(1994A,B)].

To sum up, rising relative wages and rising relative supplies are consistent with declining relative public spending on education when demand is strongly skill-biased. This is what I observed in Chile after 1975. With skill-biased demand a decrease in relative public spending on higher education will contribute towards a further widening of the wage gap across schooling groups, exacerbating the widening effect of relative demand. In these circumstances, relative public spending on education must shift towards higher education to keep relative wages constant.

Earnings Distribution

We now come full circle to apply this formulation to the variance of earnings discussed informally above. Applying the well-known variance formulae [Robbins(1979), Knight and Sabot (1983)], the variance of earnings, V(W) or σ^2, can be expressed in terms of W_i, and p_i, the wages for group i, and the percent of workers in group i:

(7) $\sigma^2 = p_1 (1 - PI) (W_1 - W_2)$.

The equation can be re-written in terms of s and w, the relative supplies and relative wages, since $p_1 = [s/(1+s)]$, and $(W_1 - W_2) \equiv (w - 1)W_2$, I have:

(8) $$\sigma^2 = \frac{s}{[(1 + s)^2]} \quad (w\text{-}1)\ W_2.$$

An increase in the relative ratio of more to less educated, s, increases the variance of earnings, for constant relative wages, w:

(9) $$\frac{\partial \sigma^2}{\partial s} = \frac{(+/-) + +}{(1\text{-}s)\ (w\text{-}1)\ W_2} \quad \begin{matrix} > \\ < \\ + \end{matrix} \quad \begin{matrix} < \\ > \end{matrix} \quad \begin{matrix} 0 \\ \text{ass} \\ 1. \end{matrix}$$

This translates the result discussed in Robinson(1976) and Knight and Sabot(1983) - where the variance of income rises as population shifts from low to high wage employment - into relative supplies and wages. It measures the "composition" effects from educational expansion in a two group case, holding relative wages constant. Similarly, holding the distribution of education constant, an increase in relative wages increases the variance of earnings:

$$(10)\quad \frac{\partial \sigma^2}{\partial w} = \frac{\overset{+}{s}\cdot\overset{+}{W_2}}{\underset{+}{(1+s)}} > 0$$

By looking at the total differential of the variance of earnings, one can examine the effect of changing relative government expenditures upon the variance of wages. The total differential of the variance of wages is:

$$(11)\quad d\sigma^2 = \frac{\partial \sigma^2}{\partial s} ds + \frac{\partial \sigma^2}{\partial w} dw.$$

Re-expressing this and using (4) and (4'), above, I get:

$$(12)\quad d\sigma^2 = \underset{+}{\frac{\partial \sigma^2}{\partial s}} \underset{+}{\frac{ds}{dg}} dg + \underset{+}{\frac{\partial \sigma^2}{\partial w}} \underset{-}{\frac{dw}{dg}} dg.$$

Thus, for a redistribution of government spending away from higher education, $dg < 0$, the first term on the right in (12) will he negative and the second term will be positive.

Redistribution of government expenditures to basic education generates two opposite effects: it decreases the variance of education (which reduces inequality) and increases the returns to schooling or relative wages (which raises inequality). If the wage effects from lowering g are large then not only will relative wages rise, but the overall earnings inequality can rise. If demand is skill-biased, this will further exacerbate the unequalizing effects of wages on the earnings distribution.

Summary

In this section I have derived five results: first, decreasing relative government expenditures on education increase equilibrium relative wages, for neutral demand(???); second, for skill-biased demand, the proportion of government expenditures on higher education must increase to keep equilibrium wages constant; third, declining relative public spending on higher education is consistent with rising relative wages and relative supply when demand is skill-biased (this is what I observed in Chile after 1975); fourth, I derived the "composition" and "wage" effects, discussed earlier, where expansion of basic education has offsetting effects on the dispersion of relative earnings. Relatedly, my fifth result is that decreasing relative government expenditures away from higher education tends to reduce earnings inequality by increasing reactive wages. Thus, if government spending on education is redistributed away from higher education at a time of skill-biased demand, overall earnings inequality can rise significantly. This appears to be what happened to Chile after 1975.

The foregoing discussion makes clear that for prospective educational policy in Chile it is crucial for me to analyze whether the trend of skill-biased growth in labor demand is likely to continue.

THE FUTURE STRUCTURE OF DEMAND CHANGES

In my earlier work [Robbins(1994A, 1994B) I found that the demand for labor has moved to favor more skilled workers, especially since 1975. Moreover, I found that these demand changes were due to within-industry shifts most likely derived from widespread technological changes. I also found that changes in relative wages after 1990 overstate the

narrowing of the relative wage gap, due to the concurrently declining average quality of university education. Will this pattern of skill-intensive demand continue? While I cannot definitively answer this question, analysis of the previous period provides some insights.

Had relative demand shifted to favor more skilled workers because of between-industry shifts resulting from changes in the relative price of capital to labor and other reforms, I might have expected this to be a one-time shift that. would not continue. However, within-industry changes seem to be the driving force behind the overall demand changes. These changes may also, to some extent, involve a catching-up process as Chile modernizes its capital to world levels. Two considerations suggest that demand may continue to be skill-biased. First, as discussed above, evidence that technological change has become increasingly skill-biased is mounting. So, as openness 'allows continued absorption of technological changes, these changes will involve skill-biased demand for labor. Second, by freeing the constraint on the capital account, trade liberalization may facilitatc thc ongoing upgrading of equipment and techniques, rather than simply a one-time catching-up.

In summary, simple extrapolation of the major trend since 1975 would suggest continued skill-biased demand and there are good analytical reasons why I might expect such skill-biased demand to continue into the future. It is, therefore, likely that the demand for university graduates will continue in the future. I saw earlier that if this is so then rising relative spending on higher education would be needed to keep relative wages constant or to lower relative wages.

Equity of access to higher education is a another important social goal and related to higher education policy. I turn to this issue in the next section. Regardless of whether the

levels of university education are and will remain inadequate, the evidence is quite strong that equity of access to university education has sharply declined, and will likely continue to do so. Because the broad policy recommendations for both goals - achieving higher levels of university graduates and increasing the equality of access to higher education - are the same, the policy recommendations point in the same direction.

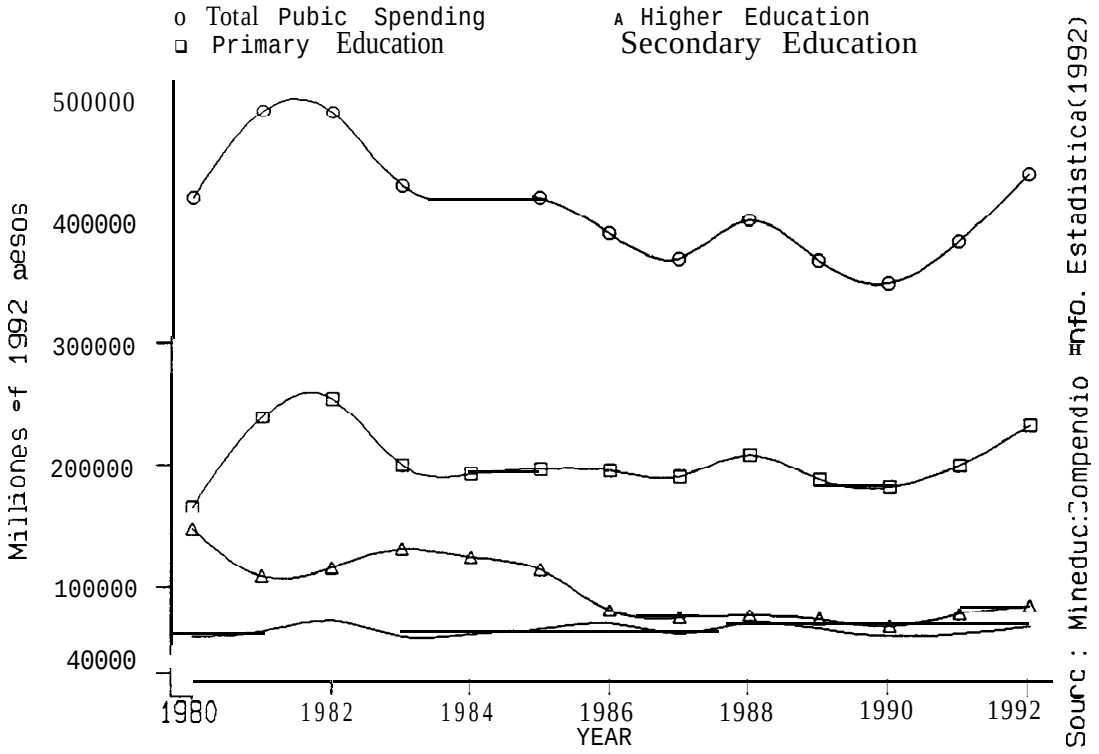
SECTION II - EQUITY OF ACCESS TO UNIVERSITY EDUCATION

In this section I turn to educational policy for higher education. I argue that it is likely there is currently a need for both inducing higher levels of university education and increasing equity of access to university education. However, even if the levels of university educated workers being generated are adequate, the equity of access remains a problem and the solution to both problems is the same. The solution is to increase the level of loans and grants - preferably needs-based - for university education. I conclude that Chile can afford to invest greater money in education, generally, and in these policies in particular. I first examine the issue of equity of access to university education.

Has Equality of Access to Higher Education Declined?

Since 1975, total public spending on higher education as a percent of total public spending on education has declined by fifty percent. In 1975 forty-two percent of public spending on education went to higher education; in 1980 thirty-six percent went to higher education. By 1988, however, public spending on higher education had dropped to 19.3 percent and was still 19.77 percent in 1992. Over this same period the share of public

spending on primary education rose from 39.64 to 53.09 percent. The share of public spending on secondary education over this period remained stable, beginning at 15.22 and ending at 15.68 [source: Estados de la Gestión Financiera del Sector Público, MINEDUC, Estadisticas de Cobertura, JUNJI, JUNAEB, INE.]. The Figure 1 below plots the levels of all real public spending by category of schooling over 1980-1992. Absolute levels of real total spending - which were the same al the end of this period - were still below 1981-2 levels. Between 1980 and 1981-2 there was a large redistribution of spending from higher education to basic education, after which spending on higher education dropped in real terms. Between 1990 and 1992, total public spending on education rose, but levels of real expenditures still remained below 1981 levels and most of these were increases concentrated in basic education expenditures.



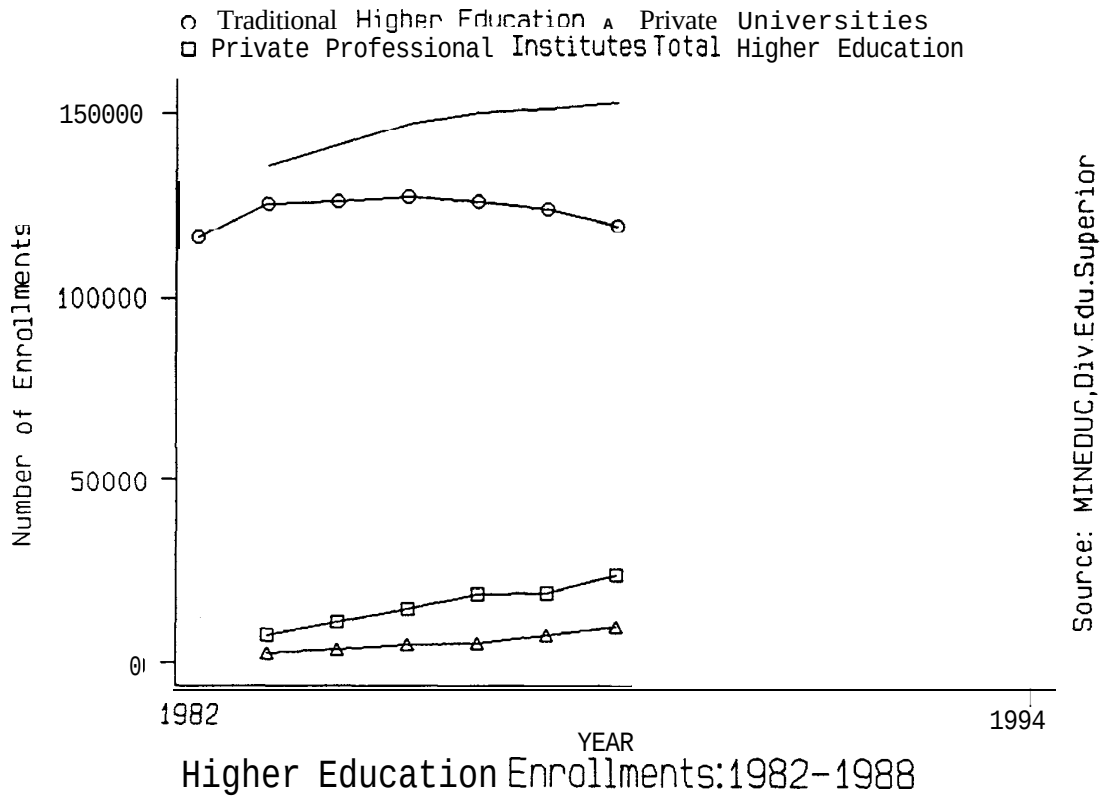
Public Spending on Education by Educational Group

FIGURE 1

Regarding the level of university enrollments and the equity of access to universities, the point to emphasize is that falling public spending on university education led to higher private costs of university education. For constant gross returns to university education, higher private costs for obtaining a university education lead to a falling private net returns to education and a lower demand for education than would be the case otherwise [Riveros(1990) shows that private net returns to education declined over 1975-1990]. Higher private costs of university education will lead to less equal access if credit markets for higher education are imperfect and compensating loans and grants from the government are unavailable.

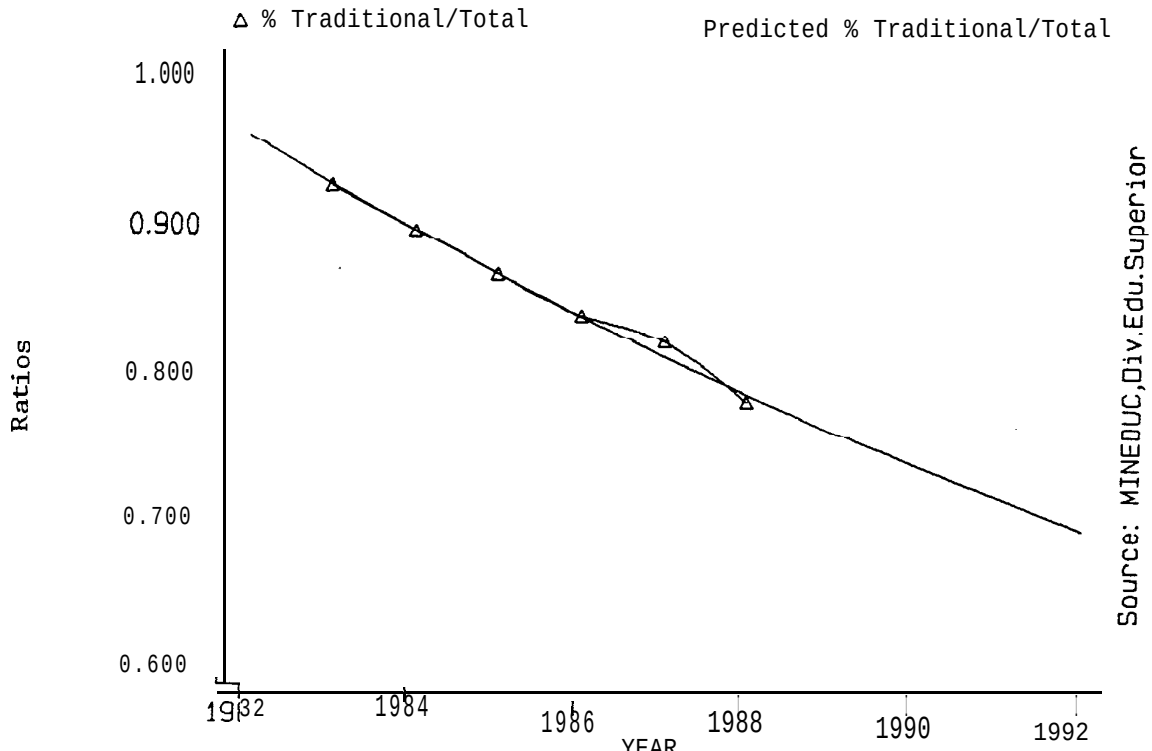
The foregoing rising costs of university education pertain to the traditional universities which received state subsidies. However, as discussed earlier, the growth in university enrollment has come almost entirely from private universities. Figure 2 plots enrollments [I could not obtain more recent figures on enrollments by private, public divisions]. The first figure plots the levels of enrollments over **1982-1988.** The **following** figure **plots the percent** of enrollments in higher education in traditional institutions over total enrollments (which shows a very sharp decline) and projects that figure through to 1992. Between 1982 and 1988 total enrollments at traditional universities and Professional Institutes receiving state support remained essentially flat, beginning at 116 thousand and ending at 119 thousand. Meanwhile private university enrollment grew from 2.7 to 10 thousand and private universities and professional institutes increased their share from thirty percent to fifty-two percent [see also Larraiiaga, 1992, p.64]. More recent figures were unavailable, but if the steady trend since 1982 continued through 1994, private provision of higher education would have risen to nearly seventy percent. It is clear in Figure 3 that private provision of higher

education rose sharply in the 1980's.



Higher Education Enrollments:1982-1988

FIGURE 2



% Higher~ tducation That IS PUBLIC :Actual, Projected

FIGURE? 3

Because private universities in Chile offer no loans or scholarships, the growth in the private provision of higher education implies a declining equality of access to higher education in Chile. An examination of who goes to private universities confirms this conclusion. For all universities, the socioeconomic representation is highly skewed to the wealthier income groups. However, for private universities this skewedness(?) is far more pronounced. In 1990 students from the top twenty percent of the income distribution occupied forty percent of all traditional university enrollments. However, in private universities the top twenty percent occupied seventy-two percent of enrollments. Similarly, the bottom forty percent constituted 18 percent of enrollments at traditional universities, while they occupied only 4.2 percent of enrollments in private universities [these figures are compiled from the 1990 CASEN; see Larrañaga(1992), p.451]. This is plotted in the Figure 4 bellow.

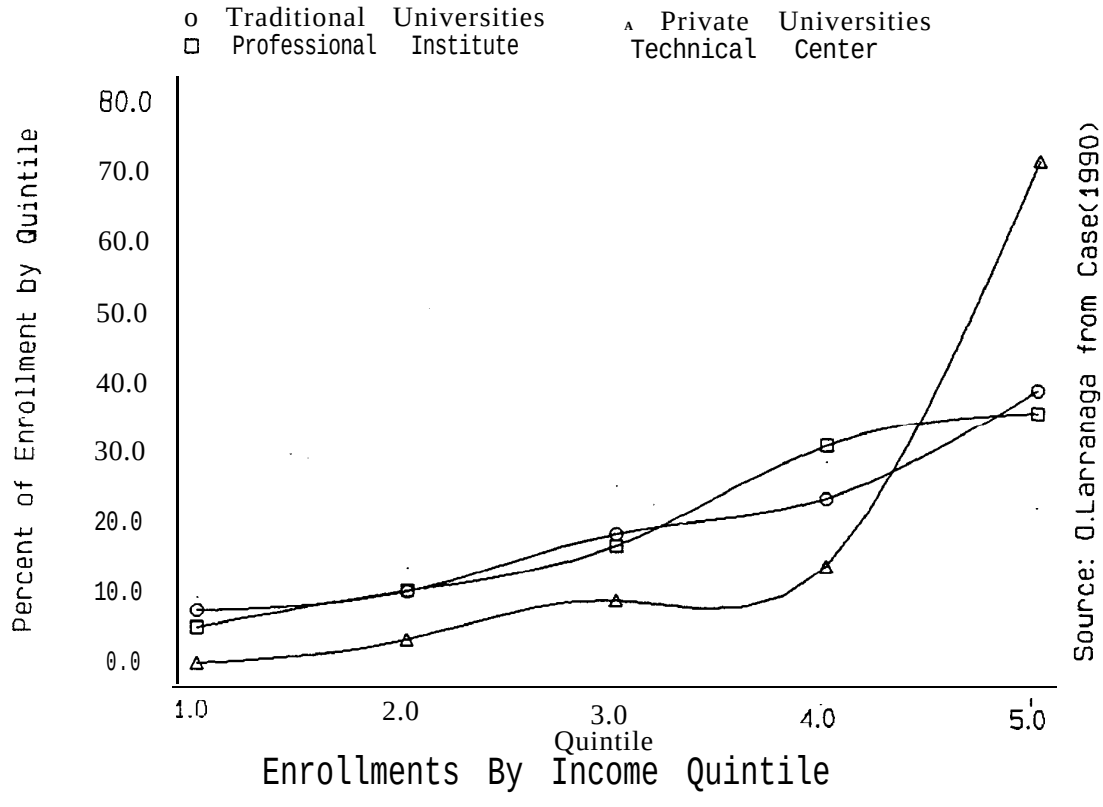

o Traditional Universities
Professional Institute
Private Universities
Technical Center
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Percent of Enrollment by Quintile
1.0
2.0
3.0
4.0
5.0
Quintile
Source: O.Larranaga from Case(1990)
Enrollments By Income Quintile

FIGURE 4

Some information on the incidence and amounts of loans for university education is also available from the 1990 CASEN data. Larrañaga shows that university loans were only mildly progressive in their incidence [Larrañaga(1992), p. 458]. While fifty-four percent of spending on health went to the forty percent of the population earning the least ["Gasto Social en Chile: Incidencia Distributiva e Incentivos Laborales", O.Larrañaga, mimeo October, 1993], only thirty-four percent of all loans and forty-three percent of the value of loans for university education went to the bottom forty percent. On net, the distribution of credits for university education was essentially even across income quintiles of the population (see Table 2, below).

However, high and rising private costs of university education would have required loan programs that were significantly skewed to favor poorer income groups. While it is true that loan programs predisposed to favor lower income groups could result in an even distribution of loans across income groups, because fewer poor were eligible for university education, the net impact of loan programs was not an improvement of the poor's position relative to other groups. An important area of further research would examine the responsiveness of the demand for education by poorer students to the increasing availability of loans and grants, and the costs and structure of those programs.

Table 2. Distribution of Education Loans for University Study

	Income Quintile (lowest to highest)				
	I	II	III	IV	V
Number of Students	17.6	18.5	17.8	22.9	23.2
Amount	25.4	18.2	20.2	18.4	17.8

Source: O.Larrañaga(1992), p.458, from CASEN, 1990.

Luaus for university study are administered semi-autonomously by the traditional universities who extend them. As a result more detailed information on loans is currently difficult to obtain. An important area for further research concerns the levels of current educational loans, the criteria used to distribute them and the sources of financing for such lending (it is not currently possible to disentangle the contributions of direct government subsidies).

Conch sion

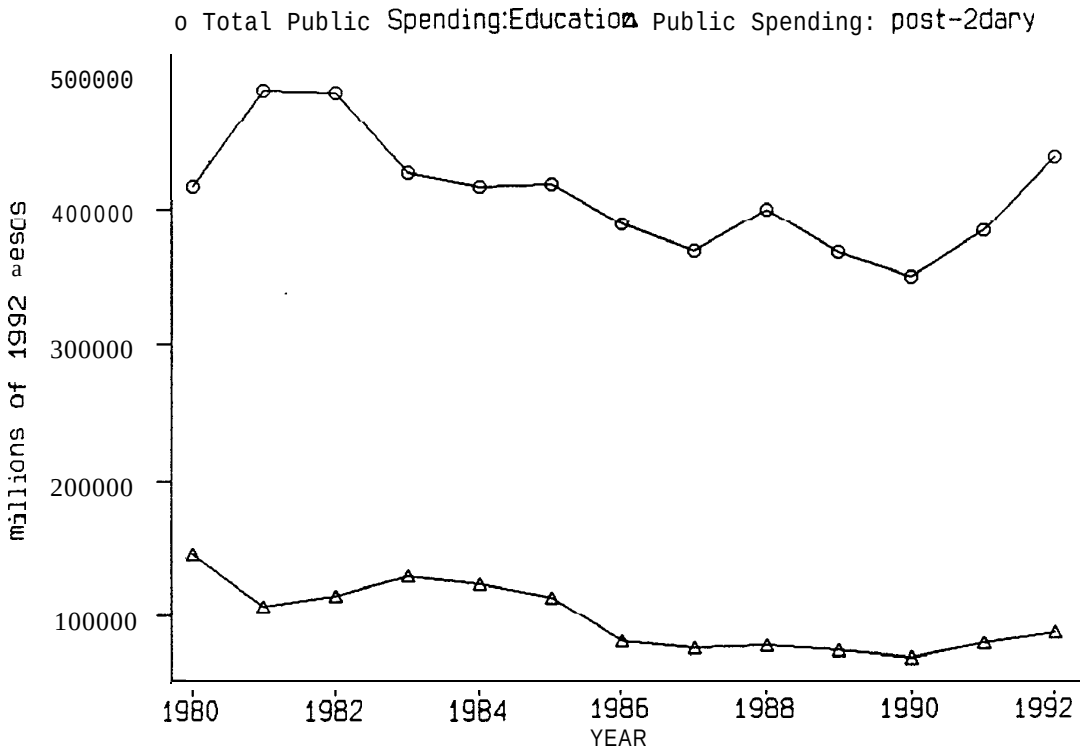
Two points are clear, however. First, the private cost of a university education has risen. This is the outcome of declining state spending on university education, and the rising share of private universities. Second, the incidence of loans across socio-economic groups is not redistributive. A larger volume of means-based loans and grants would seem justified both to achieve higher levels of university enrollments and to solve the decreasing equity of access. However, can the government afford to spend more on education, and in particular

higher education? I briefly examine this question in the next section.

SECTION III. CAN CHILE AFFORD TO SPEND MORE ON HIGHER EDUCATION?

An investigation of the optimal level and distribution of public expenditures on education for Chile would go well beyond the current note. Figure 5, below, plots the levels of public spending on total education and higher education over the 1980-1992 period [source: Compendio de Información Estadistica, 1992, Ministerio de Educacion). Since 1980, the level of public spending on education has remained relatively constant in real terms.

However, it is instructive to examine total public expenditures on education and public expenditures on higher education with reference to some benchmarks. Because my focus here is on affordability, I examine expenditures relative to GDP. While GDP grew rapidly after 1986, the average annual growth rate over the entire period is a more modest three and one half percent. Thus, it would seem reasonable from a budgetary viewpoint that educational expenditures should roughly keep with this medium-run GDP growth rate. From the viewpoint of endogenous growth theories (where human capital formation is critical to sustained growth) it might be necessary for that educational spending to keep pace with GDP growth.



Public Education Spending: Total & Higher-Education

FIGURE 5

In Figure six, however, since 1980 total public educational spending as a percent of GDP has dropped sharply. Public educational spending as a percent of GDP grew from four and seven tenths percent in 1980 to six percent in 1983, but this increase corresponds to roughly constant total spending when GDP declined sharply during the 1982-1983 depression. Subsequent to 1983 total public spending on education declined from six percent to about three percent. Beginning in 1991, this spending as a percent of GDP began to rise. It rose from three percent in 1990 to 3.19 percent in 1992. As shares of GDP, however, educational spending in 1992 was still less than two-thirds is 1980 value.

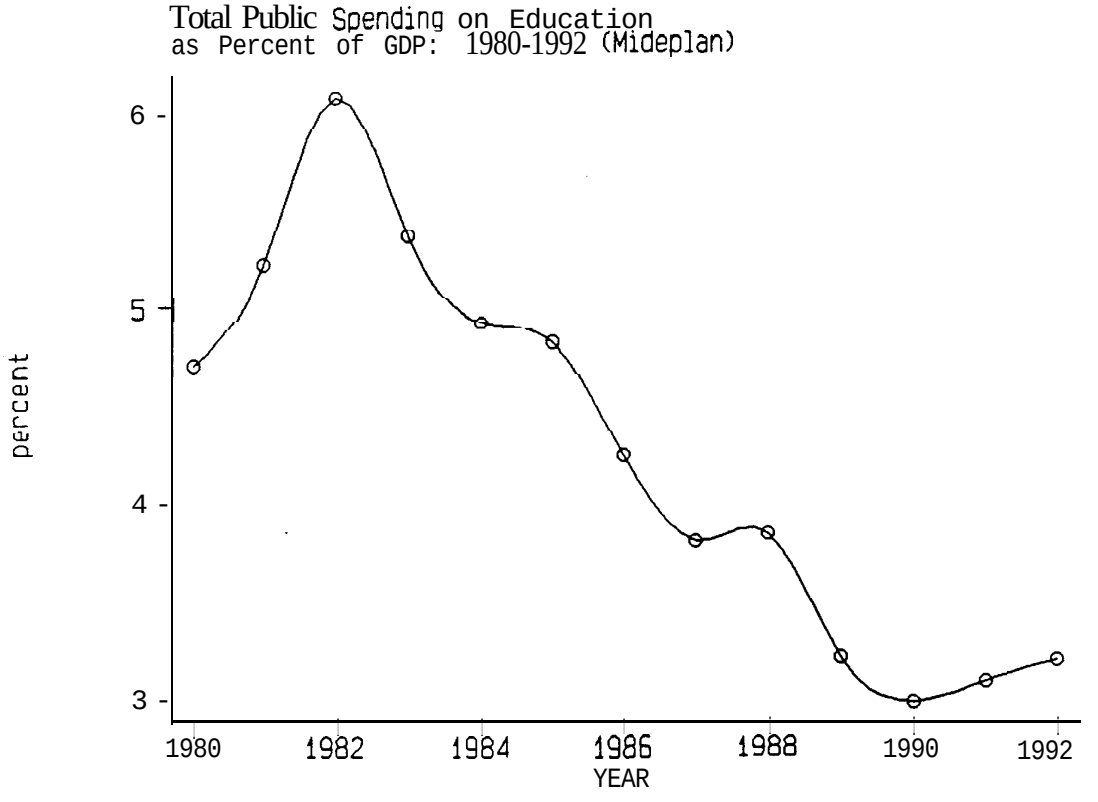

Total Public Spending on Education
as Percent of GDP: 1980-1992 (Mideplan)
percent
6
5
4
3
1980
1982
1984
1986
1988
1990
1992
YEAR

FIGURE 6

Over this period it would have been possible for public expenditures on university education as a percent of GDP to have risen or remained constant. However, as discussed earlier, the opposite occurred. The share of total public expenditures on higher education dropped from forty-two percent in 1975 (or thirty-five percent in 1990) to below twenty percent in 1992 as can seen in Figure 7 below. Between 1990 and 1992 this share remained essentially constant. Over the 1980-1992 period the share of total public expenditures on higher education fell by fifty-percent. The effect of a declining share of public expenditure on education and a declining share of higher education within public expenditures led to a large decrease in the share of public expenditures on university education as a share of GDP. The combined effects led to a sixty-two percent decline in public spending on higher education as a share of GDP between 1980 and 1992.

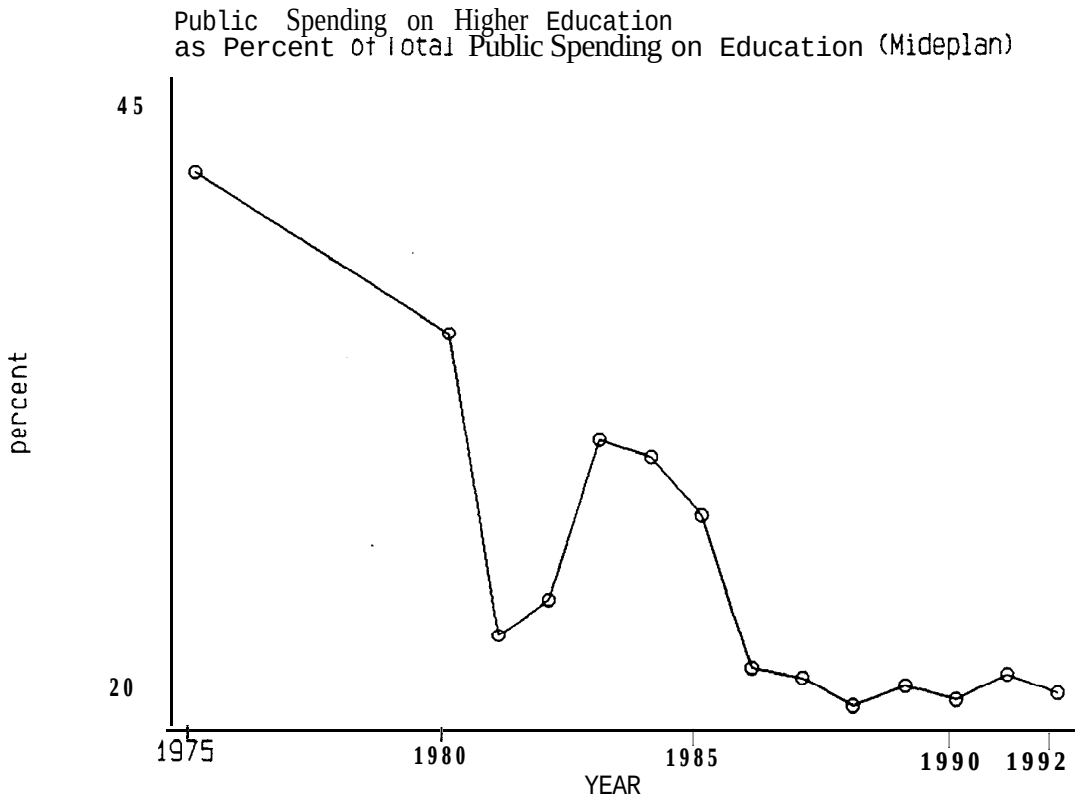

Public Spending on Higher Education
as Percent of Total Public Spending on Education (Mideplan)
45
20
percent
1975
1980
1985
1990
1992
YEAR

FIGURE 7

Because of declining public spending on education as shares of GDP between 1980 and 1992, higher public spending on education appears both affordable and, perhaps, necessary for sustained growth. It has been shown that public spending on total education remained constant in real terms over the 1980-1992 period, while the levels of real public spending on university education declined significantly. As shares of GDP, total public spending on all education and public spending on higher education both declined significantly (with the former declining over thirty percent and the latter declining over sixty percent). This suggests that more spending on total education, with a significant increase in spending on loans and grants for university education, is consistent with macro-economic balance. The previous and current elected governments have begun to increase educational expenditures, but while the rates of growth of spending are substantial, they begin from very low levels compared to 1980.

CONCLUSIONS REGARDING EQUITY AND AFFORDABILITY

Earlier, I argued that the level of university graduates may have been, and may continue to be, below the economically and socially efficient optimum. In this section I found that even if levels of university graduates were satisfactory, the equity of access to university education would continue to be an important problem. More government spending on loans and grants for higher education would help solve both the problem of potentially insufficient levels of university graduates and the problem of unequal access to university education. Moreover, it would appear that Chile can afford to spend more money on

education, generally, and loans and grants in particular.. Indeed, generally falling educational spending as a share of GDP since 1980 suggests that more spending on higher education may be necessary for continued growth of output.

SECTION IV. CONCLUSION

Educational expansion at the primary and secondary levels tends to have an equalizing effect on the distribution of earnings, for a given wage structure. However. the resulting change in relative supplies of labor generates an offsetting increase in the wages of more educated workers relative to less educated workers. If changes in the demand for labor are also skill-biased, the uncqualizing wagc cffccts will bc largcr. Moreover, in countries with higher initial levels of education, private and public rates of return to higher education are often higher than the rates of return to primary and secondary education. This confluence of facts appears to be the case, for Chile. Section 1 discussed the relationship between educational expansion, government schooling policy, relative wages and relative supply, allowing me to develop a model to analyze the facts for Chile. I show that redistribution of government spending away from higher education unambiguously contributed to the greater dispersion of relative wages and when accompanied with skill-biased demand will easily lead to higher earnings inequality. I also show that given skill-biased demand, the portion of public spending on education must rise simply to maintain constant relative wages. Section II focused on the potential role of skill-biased demand, highlighted in Section I, finding that there are good reasons why demand may continue to be skill-biased. Thus, relative government expenditures on education, which fell in the 1980's, must increase simply to

maintain constant relative wages. Section III examined the equity of access to higher education, finding that it seriously deteriorated because of higher fees at traditional universities and the growing dominance of private universities that charge high fees and give no loans or scholarships. Section IV asked whether Chile could afford to pay more on higher education and education in general. It found that because public educational spending per GDP fell sharply since 1980 and public spending on higher education fell even more sharply, that Chile both can, and probably should, increase public expenditures on education as a whole and relatively more on higher education. The recommended form for increasing higher education (to raise enrollments and equity of access while preserving decentralization) and to maintain competition in the provision of educational services is through means-tested loans and grants. This issue has begun to receive some attention from the current government, but needs to be focused on and more intensively and carefully.

These results have important implications for other countries as well. First, redistribution of relative government spending is not always warranted in LDCs and, when warranted, can be exaggerated. Second, this concern can be more important for countries liberalizing trade, as such liberalization can widen wage differentials. Third, the equity of access to higher education is likely to rapidly worsen from the redistribution of government spending on education towards basic education and the ongoing privitization of higher education. The welfare costs of these negative effects are important, but the static and dynamic efficiency losses may also be substantial.

APPENDICES

CHILE: LEVEL OF EDUCATION OF ECONOMICALLY **ACTIVE** POPULATION
(NUMBER OF PERSONS BY **HIGHEST** LEVEL OF EDUCATINONAL ATTAINMENT AND SEX)

	1960			1970	1982			1992		
	TOTAL	MALES	FEMALE3	TOTAL	TOTAL	MALES	FEMALES	TOTAL	MALES	FEMALES
PRIMARY										
INCOMPLETE	934504	737757	196747	1498345	1368230	1094962	273268	1135173	895434	239739
COMPLETE	415591	316723	98868	49961	547053	421517	125536	725982	553552	172430
TOTAL	1350095	1054480	295615	1548506	1915283	1516479	398804	1861155	1448986	412169
SECONDARY										
INCOMPLETE	433999	327925	106074	486826	512134	386658	125476	641340	481964	**160276**
COMPLETE	104216	74452	29764	255655	714980	456526	257554	1179492	779493	**400089**
TOTAL	538215	492377	135838	74248 1	1226214	843184	383030	1820832	1260467	560365
POST-SECONDARY										
ONE LEVEL	24801	17416	7385	72967	233267	132742	100525	581369	311164	**270205**
TWO LEVEL	31207	2453 1	6676	88964	125471	82527	42944	245950	148660	97290
TOTAL	56008	41947	14061	161931	358738	215269	143469	827319	459824	367495
TOTAL ECON. **ACTIVE** FOP.	2388667	1854366	534301	2695566	**3680277**	2720822	959455	46220 18	3256545	1365473
TOTAL POPULATION	5174508	2508552	2665956	6059720	7676623	3703734	3972889	7889332	3714212	4175120

SOURCE: INE, CENSO NACIONAL DE POBLACION Y VIVIENDA -- 1960, 1970, 1982 Y 1992.

NOTES:

1. IN 1960 AND 1970 THE ECONOMICALLY ACTIVE POPULATION COMPRISES INDIVIDUALS AGED 12 OR MORE. THE CENSUS IN 1982 AND 1992 REPORTS ONLY ON ECONOMICALLY ACTIVE PERSONS AGED 15 OR MORE. FOR EACH SURVEY, TOTAL POPULATION FIGURES CORRESPOND TO THE AGES USED IN DEFINING THE ECONOMICALLY ACTIVE POPULATION.

2. THE LENGTH OF STUDY REQUIRED TO COMPLETE BOTH PRIMARY AND SECONDARY EDUCATION IN CHILE HAS CHANGED OVER TIME. THE 1960 CENSUS INDICATES THAT IT TAKES 6 YEARS TO COMPLETE PRIMARY EDUCATION AND, DEPENDING ON THE TYPE OP PROGRAM, 5 TO 7 YEARS TO COMPLETE SECONDARY SCHOOL. WE HAVE DEFINED ANY NUMBER OP YEARS LESS THAN THE MAXIMUM NUMBER REQUIRED TO FINISH A PARTICULAR LEVEL AS "INCOMPLETE." FOR THE 1970, 1982 AND 1992 SURVEYS, PRIMARY EDUCATION IS REPORTED AS EIGHT YEARS IN LENGTH, WITH SECONDARY EDUCATION REQUIRING 5 TO 6 YEARS TO COMPLETE. ME LATTER THREE SURVEYS REPORT EDUCATIONAL ATTAINMENT IN PAIRS OF YEARS, SO WE DEFINED ANY NUMBER OP YEARS LESS THAN THE LAST "IWO YEARS REQUIRED TO COMPLETE AS "INCOMPLETE." FOR POST-SECONDARY EDUCATION, WE DEFINED THE "ONE" LEVEL AS ONE TO FOUR YEARS OP POST-SECONDARY INSTRUCTION AND THE "IWO" LEVEL AS MORE THAN FOUR YEARS OF POST-SECONDARY INSTRUCTION.

3. THIS TABLE DOES NOT INCLUDE THE DATA REPORTED UNDER THE CATEGORIES "OTHER," "SPECIAL," "NONE," AND "UNANSWERED."

CHILE: LEVEL OF EDUCATION OF TOTAL POPULATION **AGED 15** OR MORE
(NUMBER OF PERSONS BY HIGHEST LEVEL OF EDUCATIONAL ATTAINMENT AND SEX)

	1960			1970	1982			1992		
	TOTAL	MALES	FEMALES	TOTAL	TOTAL	MALES	FEMALES	TOTAL	MALES	FEMALES
PRIMARY										
INCOMPLETE	1692938	816627	8763 11	4443797	2907295	1386268	1521027	2972685	1416449	**1556236**
COMPLETE	745928	356163	389765	325540	1125200	562064	563 136	861965	432138	429827
TOTAL	2438866	1172790	1266076	4769337	4032495	1948332	2084163	3834650	1848587	1986063
SECONDARY										
INCOMPLETE	893266	432884	4603 82	1056452	**1211195**	594560	616635	2404298	1199456	1204642
COMPLETE	171497	88167	83330	465533	1358105	629920	728185	1648659	**760560**	888099
TOTAL	lo64763	521051	543712	1521985	2569300	1224480	1344820	**4052957**	1960016	209244 **1**
POST-SECONDARY										
ONE LEVEL	45465	27009	18456	**142741**	39482 I	201231	193590	763244	366439	396805
TWO LEVEL	**36502**	27517	8985	109633	**150619**	94246	56373	352069	200227	151842
TOTAL	**81967**	54526	27441	252374	545440	295477	249963	**1115313**	566666	548647
TOTAL POPULATION	4451597	2144688	2306909	5403626	7676623	3703734	3972889	7889332	3714212	4175120

SOURCE: INE, CENSO NACIONAL DE POBLACION Y VIVIENDA – 1960, 1970, 19[illegible] Y 1992.

NOTES:

1. FOR EACH SURVEY, TOTAL POPULATION FOURES CORRESPOND TO THE NUMBER OF INDIVIDUALS AGED 15 OR MORE.
2. THE LENGTH OF STUDY REQUIRED TO COMPLETE BOTH PRIMARY AND SECONDARY EDUCATION IN CHILE HAS CHANGED OVER TIME. THE 1960 CENSUS INDICATES THAT IT TAKES 6 YEARS TO COMPLETE PRIMARY EDUCATION AND, DEPENDING ON THE TYPE OF PROGRAM, 5 TO 7 YEARS TO COMPLETE SECONDARY SCHOOL. WE HAVE DEFINED ANY NUMBER OF YEARS LESS THAN THE MAXIMUM NUMBER REQUIRED TO FINISH A PARTICULAR LEVEL AS 'INCOMPLETE.' FOR THE 1970, 1982 AND 1992 SURVEYS, PRIMARY EDUCATION IS REPORTED AS EIGHT YEARS IN LENGTH, WITH SECONDARY EDUCATION REQUIRING 4 TO 6 YEARS TO COMPLETE. THE FORMER TWO SURVEYS REPORT EDUCATIONAL ATTAINMENT IN PAIRS OF YEARS, SO WE DEFINED ANY NUMBER OF YEARS LESS THAN THE LAST TWO YEARS REQUIRED TO COMPLETE AS "INCOMPLETE." IN ALL CASES, FOR POST-SECONDARY EDUCATION WE DEFINED THE "ONE" LEVEL AS ONE TO FOUR YEARS OF POST-SECONDARY INSTRUCTION AND THE "TWO" LEVEL AS MORE THAN FOUR YEARS OF POST-SECONDARY INSTRUCTION.
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